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Making and Keeping Your Cattle Herd Safe from Bovine Viral Diarrhea (BVD)

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In 2007-08, the U.S. Department of Agriculture's National Animal Health Monitoring System (NAHMS) conducted a study[i] of U.S. beef cow-calf operations. When asked about Bovine Viral Diarrhea (BVD), only 64% of the respondents were fairly knowledgeable or knew some basics about the disease. Twelve percent of respondents had not heard of BVD.

BVD is a viral disease of ruminants that causes decreased production, pneumonia, abortion and diarrhea. In addition, the virus suppresses the immune system and makes infected animals more susceptible to other diseases. Losses due to BVD are primarily decreased production, abortion, and diarrhea. In a 10-year profitability model[ii], the economic effect of BVD virus exposure was $14.85 to $24.84 in decreased return to fixed costs per beef cow exposed per year. A recent feedlot study[iii] determined that economic losses from BVD virus were $5.26/animal in fatalities, and $88.26/animal in performance losses.

The main source of infection is persistently infected (PI) animals. Since their immune systems do not recognize the virus as dangerous, PI animals are born with an incurable BVD infection. This "carrier" condition develops when fetal calves are exposed to the virus in the early period (50 to 150d) of gestation. Exposure during this time results in the fetus' immune system not recognizing the virus as foreign. These calves can abort or be carried to full-term, delivered, and appear clinically normal. PI animals shed tremendous amounts of virus into the environment; enough to infect even well-vaccinated animals.[iv] Neither vaccination nor time will reduce the shedding of BVD virus into the environment by PI animals.

Cattle cannot become "PI" after they are born, but may shed virus due to an acute, transient infection. Transient infections usually resolve after a few weeks as the animal's immune system overcomes the virus. Breaches in biosecurity often precede most transient infections. These can include fence line exposure, new introductions, or commingling with other herds. In some areas wildlife (e.g., cervids) may spread the disease. Pregnant animals transiently infected during the first trimester may create PI animals.

Testing

There are many accurate tests available to look for BVD virus (BVDv). The most common techniques use antibodies to detect the presence of virus in a skin sample. Because ears are handy, a small ear notch (nickel-sized) is submitted to the laboratory for BVDv testing. Both young and old can be tested, and the test is relatively inexpensive and rapid. Laboratories typically have a one or two-day turnaround time.

Calves should be tested:
Some producers use PI-free certification as a marketing incentive. Because PI calves are life-long carriers and shedders of BVDv, feedlot and replacement heifer buyers are demanding that purchased animals have a negative PI status. Therefore, calves should be tested, and sooner is better, because PI calves should be removed from the herd prior to the breeding season. Depending on management practices, this can be done at

spring branding, vaccination, and castration, or any time before bulls are turned in with the cow herd.

Other animals to test:
All animals, including bulls, purchased from another site should be tested prior to entry on the farm. This prevents introduction of a PI positive animal into the herd. All stillborn calves, calves born with congenital defects, or calves that die in the first few months of life, regardless of cause, should be tested to rule out BVDv as the underlying cause.

Do I need to test all of my calves every year?
The answer to this question depends on the risk of BVD to your operation. Your herd is at higher risk if BVDv has been diagnosed in the recent past. If you are unable to implement a sound vaccination program, your herd is at higher risk. And finally, if you commingle your cattle with herds or groups of animals that do not practice preventative strategies for BVDv, your cattle are at higher risk. The risk to your herd is very high when commingling happens during breeding season. Your veterinarian can help determine the risk to your herd. If your herd is considered high risk, testing all calves along with implementation of a sound vaccination and biosecurity program is warranted. For those marketing or raising cattle in systems that require BVDv testing, each calf crop will need to be tested to verify they are PI free.

Biosecurity

Biosecurity simply defined, is steps taken to prevent introduction of infectious agents into a herd. It is accompanied by increased levels of vigilance to ensure that animals are protected from potential threats, be they man-made, environmental, or from an infectious disease.

In terms of BVDv, the first step in becoming biosecure is to conduct a risk assessment to determine the current level of infection and the potential for any viral introduction routes. Laboratory testing is used to determine if any animals are infected and at what level. Detection of PI-BVD animals indicates that the herd has had previous exposure to the virus and likely that there are active cases.

Once PI-BVD animals are identified and removed from the herd, the next likely source of BVDv is in the purchase or introduction (accidental or intentional) of non-tested animals into the herd. Dr. D. R. Wolfgang, Extension Veterinarian from Pennsylvania State University, suggested using the acronym IRS to implement biosecurity best management practices. The acronym stands for **I**solation, **R**esistance, and **S**anitation.

Isolation
Whenever an animal is brought onto the farm or ranch from an outside source, isolate the animal from animals already on site for a minimum of two weeks, and four weeks is preferable. If not done already, screen the animal for PI-BVD status. In addition, monitor the animal for disease signs, including those caused by BVDv infection. Isolation includes good fencing, which reduces the opportunity for neighboring animals to spread disease agents by commingling. Remember that viruses can be spread across fences when animals in separated fields have "fence line" contact.

Visitors that have been around infected animals on other farms can introduce BVDv. Local veterinarians, farm supply representatives or even neighbors can bring BVDv onto a farm. Use of protective foot baths or disposable protective clothing minimizes the potential for disease transmission from farm to farm; including BVD.

Resistance (Vaccination)
Vaccines that induce protection against BVDv are easily obtained, and most are effective in preventing disease. In 1997, the most recent NAHMS cow-calf published data, 75% of the operations in the United States did not vaccinate their calves for BVDv prior to weaning. Furthermore, only 13% of cow-calf operations in 1997 required BVD vaccination of cattle brought onto their operations.[v] This is in contrast to the dairy industry where about 75% of dairy producers vaccinate heifers and cows against BVDv.[vi]

When selecting a vaccine, consider these things:

- The virus has two forms: type I and II. Consider using vaccines that target type I and II. Most dairy producers (61%)[v] use vaccines that protect against both types.

- Vaccines use either modified-live or inactivated (killed) virus preparations. In 1997, slightly more cow-calf producers used killed vaccines against BVD (12%) versus modified live virus vaccines (7.2%).[iv] About 62% of dairy heifers and 49% of dairy cows in the U.S. are vaccinated using modified-live vaccines.[v] Inactivated – killed – vaccines can be used in any animal (heifer, bull, pregnant or non-pregnant

lactating cow), but a booster shot is required with strict adherence to label instructions. Modified-live vaccines are used in heifers, bulls or non-pregnant cows.

Modified-live vaccine use on or near pregnant cows (including nursing calves) has the potential to result in fetal infection or abortion. There are some modified-live preparations that allow use in, or near, pregnant cattle provided certain label requirements are met.

- In your breeding animals, select those vaccines with proven gestational protection for the fetus. Some vaccines have a longer duration of immunity and offer a higher degree of protection for the fetus. Those that do will have a label claim stating some degree of fetal or gestational protection.

- Administer an annual booster for BVDv to previously vaccinated animals prior to the breeding season in your breeding animals. This ensures the best possible level of protection during the critical first trimester.

Who should be vaccinated*?*
All animals (bulls, new additions, calves, heifers and cows requiring boosters) should be vaccinated; ideally prior to breeding. Keep accurate and current records that include date, animal ID, and product name. Problems that result from improper use, defective products, or natural immune suppression are solved more easily if records are kept.
Proper use of vaccines is critical. Make sure vaccines are handled safely, reconstituted properly, kept at label-recommended temperatures, and administered as recommended. Failure to vaccinate properly will result in a limited immune response and false sense of security. Consult your veterinarian to assist in developing a vaccination protocol for your operation.

Sanitation
Finally, if there is an outbreak of BVD, sanitize calving areas, or if range calving, move cattle to fresh bedding grounds to minimize virus buildup. If using calving sheds, clean sheds often during the calving season to reduce the risk of infection. Avoid sharing livestock equipment (including trailers) with other operations until properly cleaned.

For More Information on Utah's PI BVD Testing Program Contact:

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[i] NAHMS Beef 2007-08. United States Department of Agriculture, Animal and Plant Health Inspection Service.
[ii] Larson et. al., Bov Pract 2002;36(2):106-112
[iii] Hessman, BE, RW Fulton, DB Sjeklocha, TA Murphy, JF Ridpath, ME Payton. *Evaluation of economic effects and the health and performance of the general cattle population after exposure to cattle persistently infected with bovine viral diarrhea virus in a starter feedlot.* January 2009, JVR.Vol. 70, No. 1, Pages 73-85.
[iv] Bovine Viral Diarrhea Virus: Diagnosis, Management and Control; by Sagar M. Goyal and Julia F. Ridpath. August 2004, p. 96.
[v] NAHMS Beef 1997. USDA-APHIS
[vi] NAHMS Dairy 2007. USDA-APHIS